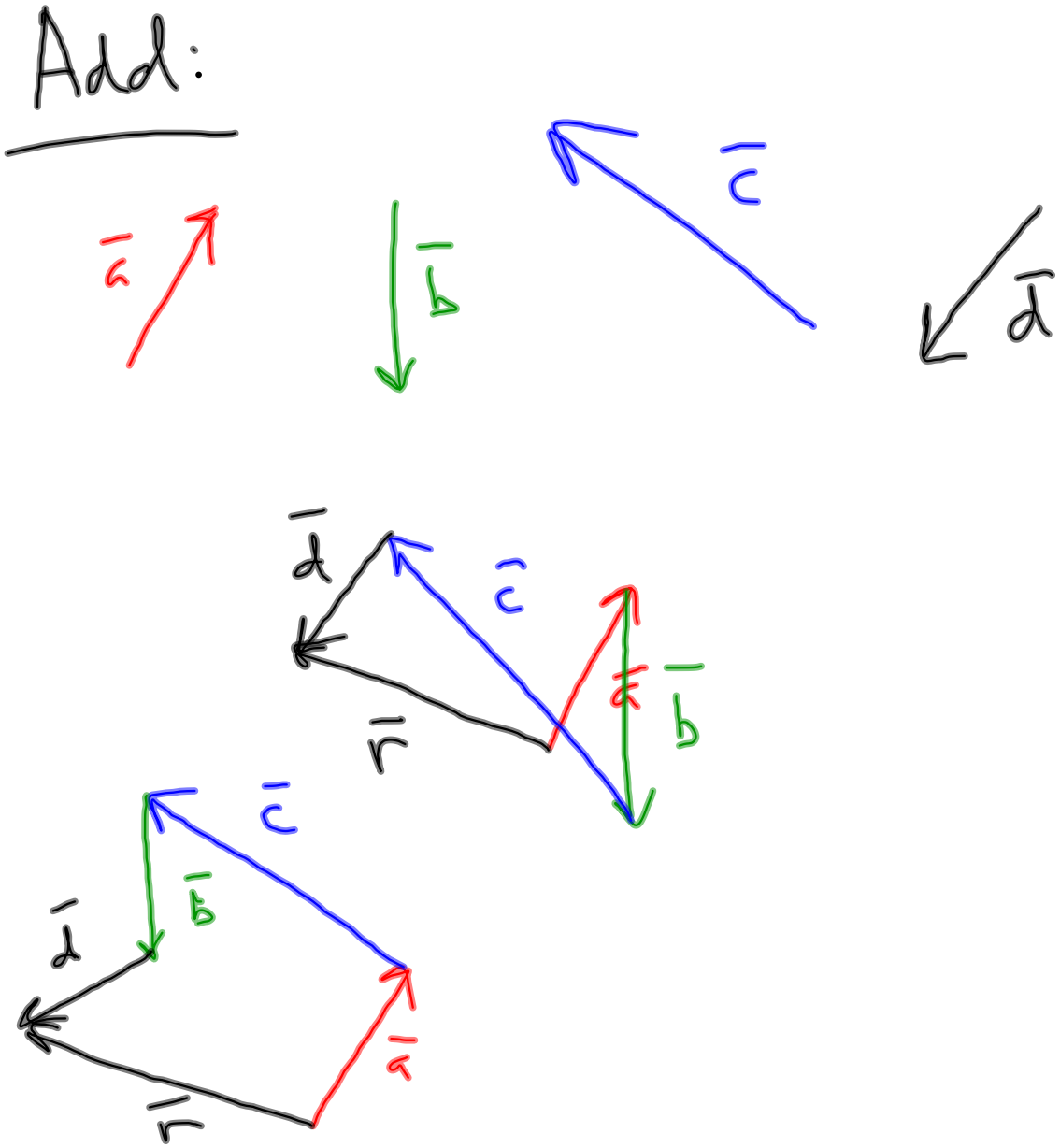

Add:
a
b
c
d
r

Algebraically:

$$\cos(60^\circ) = \frac{a_x}{a}$$

$$a_x = a\cos(60^\circ)$$
$$= (15\text{ m})\cos(60^\circ)$$
$$= 7.5\text{ m}$$

– Two ways to solve for a_y:

1. Trig. identities

$$\sin(60^\circ) = \frac{a_y}{a} \qquad \tan(60^\circ) = \frac{a_y}{a_x}$$

2. Pythagorean theorem

$$a^2 = a_x^2 + a_y^2$$

$$\sin(60^\circ) = \frac{a_y}{a}$$

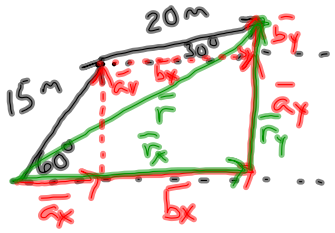
$$a_y = a\sin(60^\circ)$$
$$= (15\text{ m})\sin(60^\circ)$$
$$= 12.99\text{ m}$$

$$\cos(30^\circ) = \frac{b_x}{b}$$

$$b_x = b\cos(30^\circ)$$
$$= (20\text{ m})\cos(30^\circ)$$
$$= 17.3\text{ m}$$

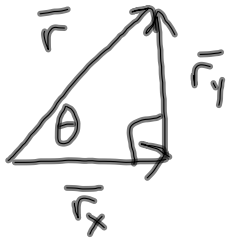
$$\sin(30^\circ) = \frac{b_y}{b}$$

$$b_y = b\sin(30^\circ)$$
$$= (20\text{m})\sin(30^\circ)$$
$$= 10\text{ m}$$



$$r_x = a_x + b_x$$
$$= 7.5\,m + 17.3\,m$$
$$= 24.8\,m$$

$$r_y = a_y + b_y$$
$$= 12.99\,m + 10\,m$$
$$= 22.99\,m$$



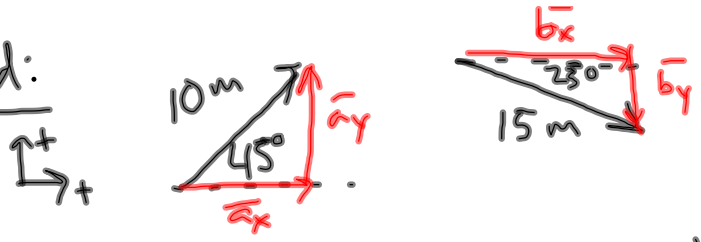
$$r^2 = r_x^2 + r_y^2$$
$$r = \sqrt{r_x^2 + r_y^2}$$
$$= 33.8\,m$$

$$\tan\theta = \frac{r_y}{r_x}$$

$$\theta = \tan^{-1}\left(\frac{r_y}{r_x}\right)$$
$$= \tan^{-1}\left(\frac{22.99\,m}{24.8\,m}\right)$$
$$= 42.8°$$

$$\bar{r} = 33.8\,m \text{ @ } 42.8° \text{ North of East}$$

Add:



$a_x = {}^{+}a\cos(45^\circ) = (10\text{m})\cos(45^\circ) = 7.07\text{m}$

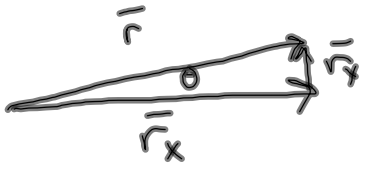
$+\ b_x = {}^{+}b\cos(250^\circ) = (15\text{m})\cos(250^\circ) = 13.6\text{m}$

$r_x = 20.67\text{ m}$

$a_y = {}^{+}a\sin(45^\circ) = (10\text{m})\sin(45^\circ) = 7.07\text{m}$

$+\ b_y = {}^{-}b\sin(25^\circ) = -(15\text{m})\sin(250^\circ) = -6.34$

$r_y = .732\text{ m}$



$r^2 = r_x^2 + r_y^2$

$r = 20.673\text{ m}$

$\tan\theta = \frac{r_y}{r_x}$

$\theta = \tan^{-1}\left(\frac{r_y}{r_x}\right)$

$= 2.02^\circ$

$\bar{r} = 20.673\text{ m}\ @\ 2.02^\circ\ N\ of\ E$

HW: p. 94: 1, 3, 4